

STORMWATER DRAINAGE REPORT

FOR

DEFINITIVE PLAN

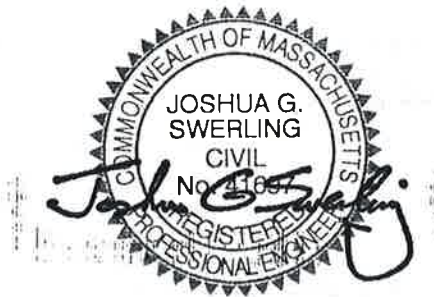
for:

SOUTHEAST KELLEY'S CORNER LOTS

***ASSESSOR'S MAP 3F, LOTS 118-2, 127 & 134
400 Massachusetts Avenue (a.k.a. Route 111)
Town of Acton, Massachusetts
Middlesex County***

Prepared by:

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BEPC #W151042



BOHLER
ENGINEERING

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I. INTRODUCTION

The following report provides an analysis of the stormwater drainage conditions that will result from the subdivision of the subject site. The site is located along the southerly side of Massachusetts Avenue, (a.k.a. Route 111) and is identified by the Acton Assessor's Office as Map F3, Lots 118-2, 127 & 134. The site is currently partially paved with an existing "Acton Children's School" and related parking and landscaped areas. The property is bound to the north by Massachusetts Avenue (a.k.a. Route 111), a two-way, two-lane road under State jurisdiction, to the south by vacant land, to the west by "CVS Pharmacy" and to the east by wetlands. The site is located mostly within the flood hazard Zone X (areas outside the 100 year flood plain) with a small area along the wetlands that are in Zone A (flood zone) per FEMA mapping.

This report includes an analysis of the existing and proposed drainage characteristics of the site and provides a detailed analysis of the proposed stormwater management facilities and best management practices (BMPs) that will control the stormwater outflow associated with the post-redeveloped site.

II. DRAINAGE – EXISTING SITE CONDITIONS

The Drainage Area E-1 contains 71,926 sf of land which consists of pavement, woods and landscaped areas that sheetflow to the wetlands untreated or via an inlet along Rte 111 which eventually conveys the stormwater to the wetland. All of the existing drainage areas are shown on "Existing Drainage Tributary Map" which is included within the Appendices of this report.

III. DRAINAGE- PROPOSED SITE CONDITIONS

The post-development conditions include a paved private road and associated site improvements which include stormwater management facilities, utility mains, landscaping, and various site improvements as illustrated on the Definitive Plans prepared by Bohler Engineering. It should be noted that post development conditions will result in an increase in the amount landscaped areas by approximately 14,000sf which will improve recharge and mitigate peak runoff to the site.

Drainage area P-1, consists of 71,926 sf of pavement, woods and landscaped areas. Stormwater from this area is collected via a new water quality inlet before being routed to the wetlands which will improve water quality over existing conditions. The addition of the Water quality Inlet will provide 80% TSS removal for the runoff produced by the site which far exceeds what was provided under existing conditions. Additionally, post-redevelopment runoff rates have been reduced for all storm events and groundwater recharge conditions have been improved due to the reduction in impervious areas.

Please refer to the "Proposed Drainage Tributary Map" included within the Appendices of this report for a graphical representation of the proposed drainage areas.

IV. DRAINAGE ANALYSIS METHODOLOGY

The methodology utilized to design the subject stormwater management system to demonstrate compliance with the Town of Acton, State and Federal requirements/guidelines is based on the rational method.

V. DRAINAGE ANALYSIS RESULTS

The analysis of post development stormwater conditions indicate that the peak rates of runoff rates will be decreased compared to the existing conditions, as shown on the attached tables.

Table 1 - Stormwater Runoff Rate - Summary to Design Point 1 (DPP-1, Wetlands)

Storm Frequency	Existing Flow (CFS)	Proposed Flow (CFS)	Change (CFS)
2 year	2.62	1.95	-0.67
10 year	3.55	2.66	-0.89
25 year	4.19	3.13	-1.06
100 year	5.29	3.95	-1.34

VI. CONCLUSIONS

Analysis of the proposed stormwater management system indicates that the proposed redevelopment will result in a decrease in the post-development peak runoff rates. Additionally, the proposed best management practices will provide the benefits of improving TSS removal for the site's runoff prior to discharge to the municipal drainage system, as well as to their respective design points. As a result, there will be no negative impacts to the existing drainage infrastructure or receiving waters as a result of the proposed development.

VII. STORMWATER MANAGEMENT STANDARDS

As outlined below, the proposed drainage system was designed in accordance with the Massachusetts Stormwater Management Policy.

Standard #1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Runoff from impervious areas on site will be collected via a water quality inlet which will clean stormwater prior to entering the wetlands.

Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Runoff rates for the post-redevelopment conditions were calculated for the 2-year, 10-year, 25-year and 100-year 24-hour storm events and as demonstrated within this report, peak post-development stormwater runoff rates do not exceed pre-development rates.

Standard #3: Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance.

Due to the large increase in pervious landscaped areas site recharge will be improved.

Standard #4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

Water quality measures have been provided for this site including water quality inlets to achieve the 80% TSS requirement.

Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The proposed use is not a land use with higher potential pollutant loads.

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

The site does not contain, nor directly discharge to any critical areas, as defined by the MADEP.

Standard #7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable.

The site qualifies as a re-development as we are improving the site from existing conditions with the reduction of peak rates and the water quality measures introduced. Standards 1, 2, 4, 5, 6, 7, 8, 9 & 10 have been met. All other standards have been met to the maximum extent practicable.

Standard #8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

An erosion and sediment control plan has been developed for this project implementing: silt fence, a crushed stone construction exit, catch basin inlet protection, and provisions for stabilizing disturbed areas.

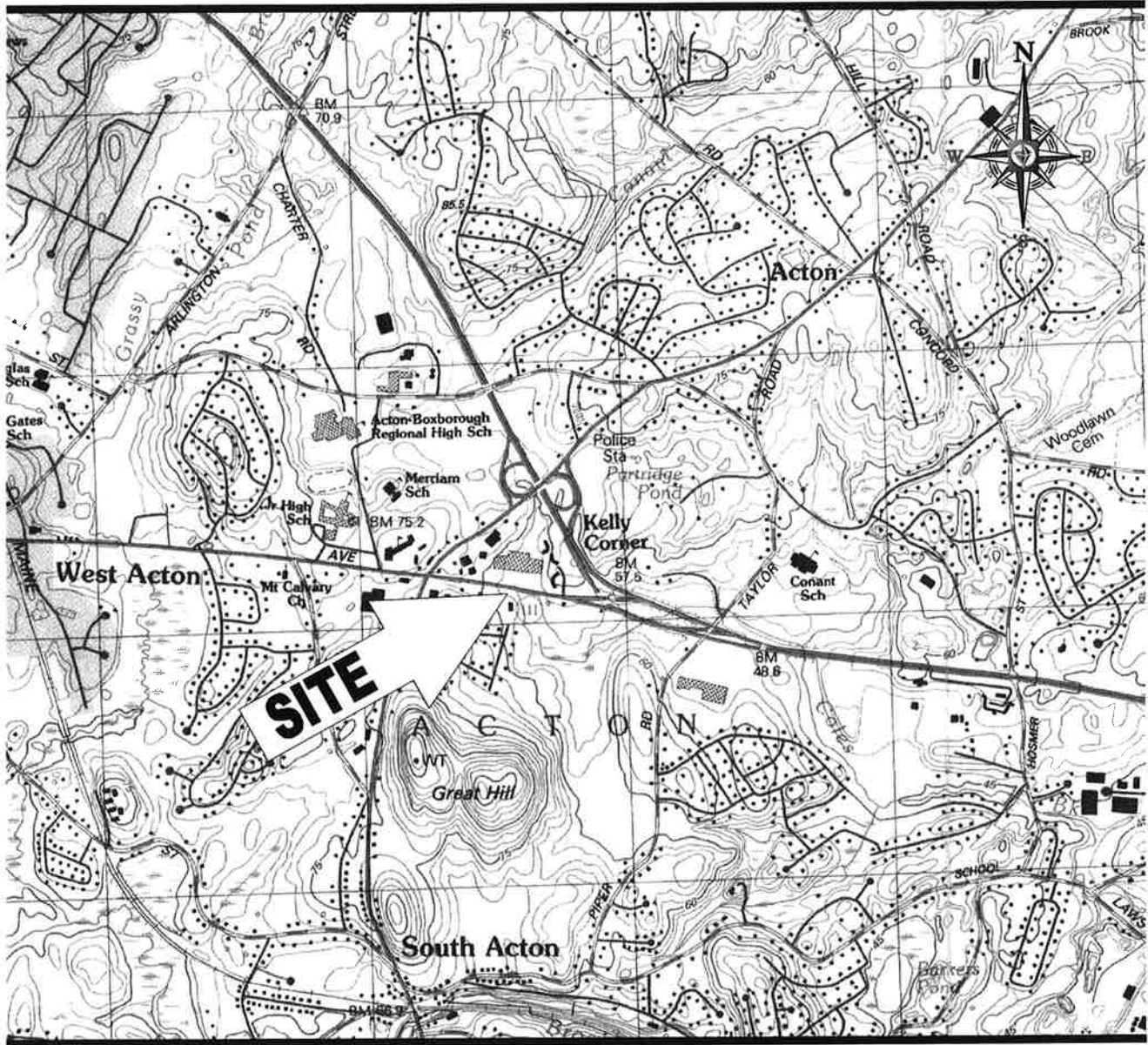
Standard #9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

An Operation and Maintenance Plan for the proposed BMP's has been developed for this project and is included within the appendices of this report.

Standard #10: All illicit discharges to the stormwater management system are prohibited.

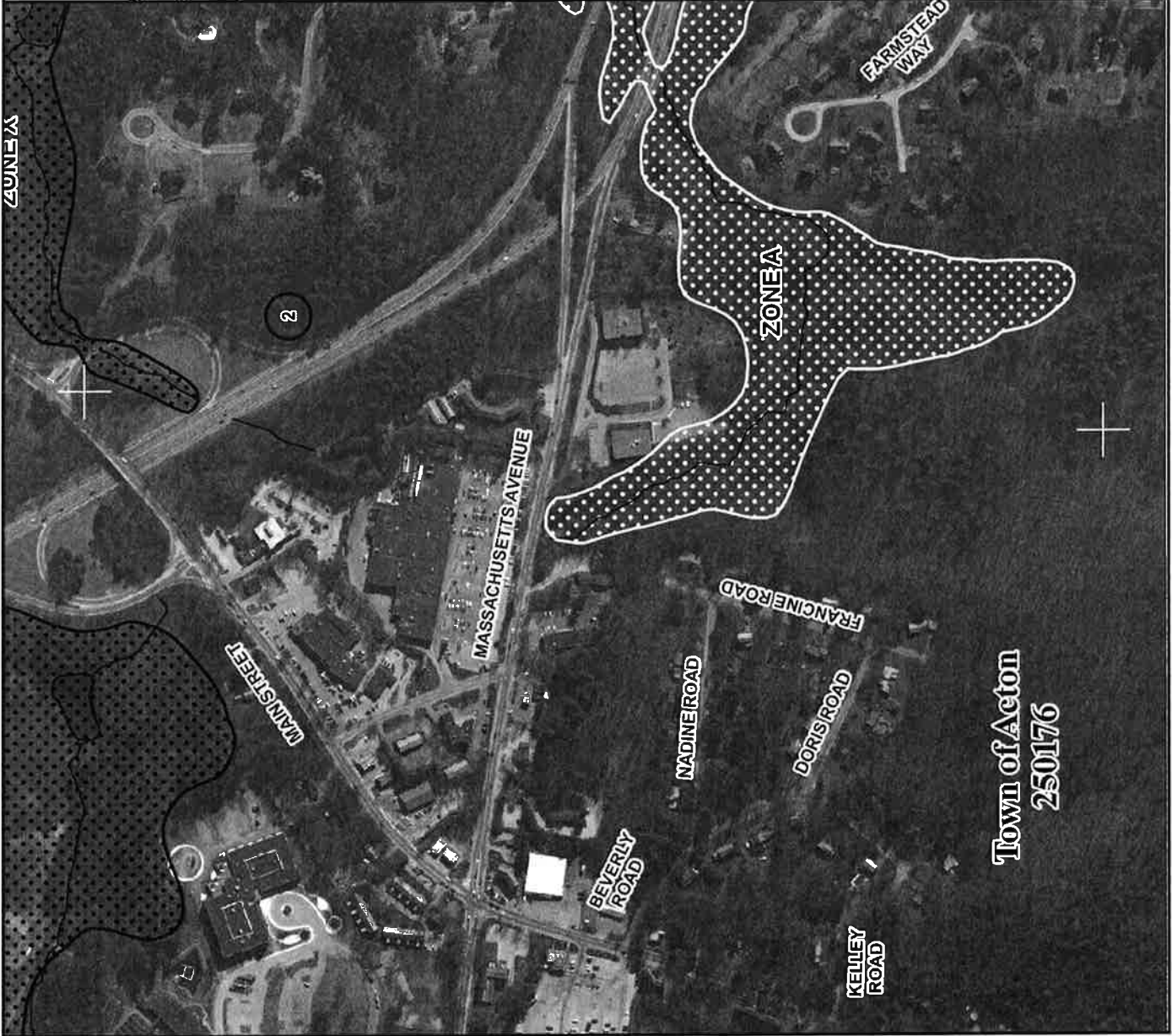
No illicit discharges will be created as part of the site construction in the area in question.

Appendix 1

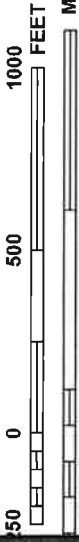


LOCATION MAP

SCALE: 1"=2000'
PLAN REFERENCE: MASSGIS USGS IMAGE



MAP SCALE 1" = 500'



NFIP

PANEL 0352E

FIRM

FLOOD INSURANCE RATE MAP
MIDDLESEX COUNTY,
MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 352 OF 656

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
COMMUNITY NUMBER 250176
ACTON, TOWN OF
PANEL 0352
SUFFIX E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community



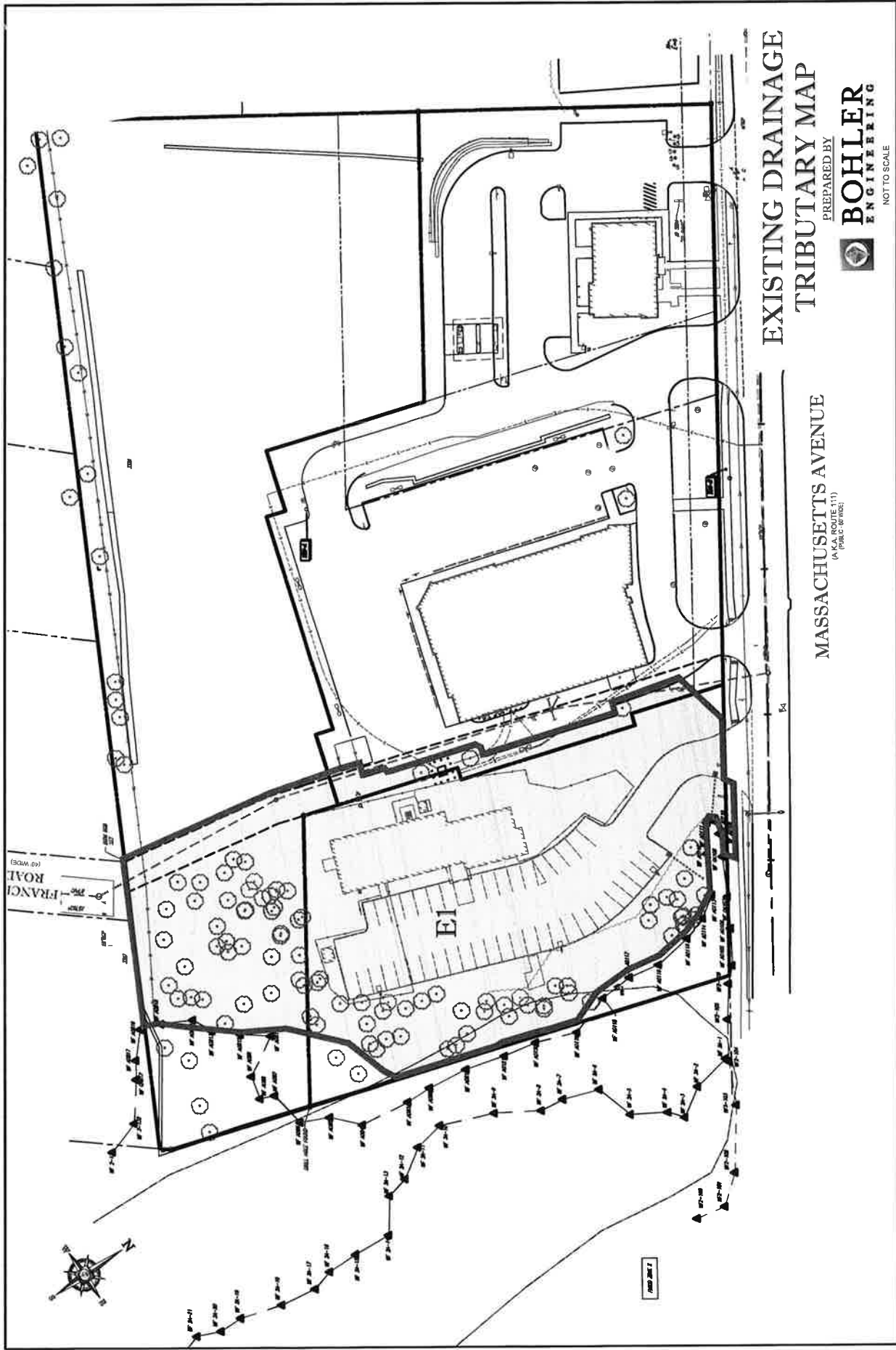
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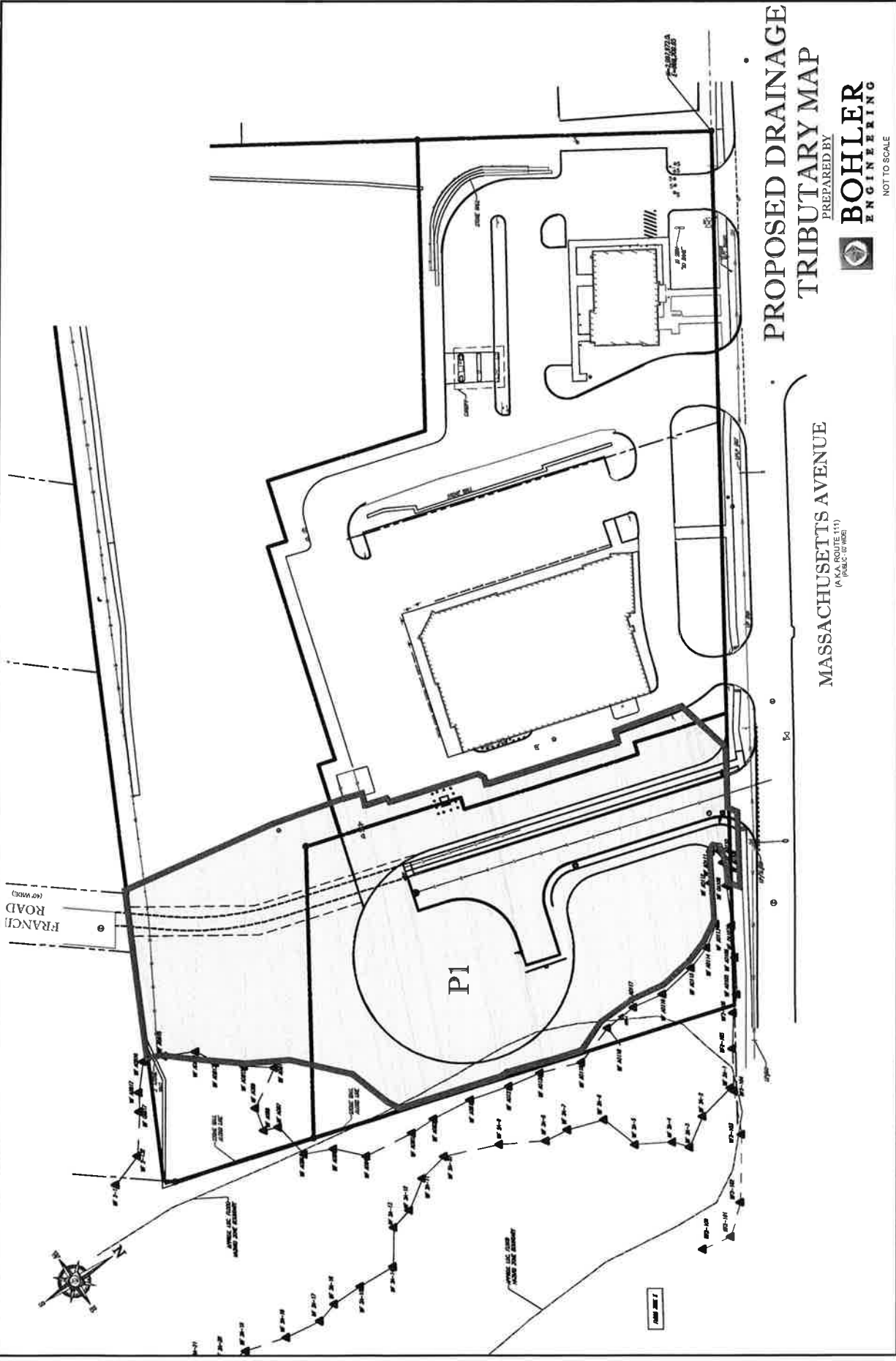
EFFECTIVE DATE
JUNE 4, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix 2





PROPOSED DRAINAGE
TRIBUTARY MAP

PREPARED BY
BOHLER
ENGINEERING
NOT TO SCALE

MASSACHUSETTS AVENUE
(A KA ROUTE 111)
(PUBLISHED 1988)

FRANCH
ROAD
(40 WOOD)

P1

Appendix 3

ATTENUATION CALCULATIONS

"C" BEFORE: EXISTING SITE

CONDITION	AREA (SF)	%	COEFF.	FRACT. COMP.
ASPHALT/BUILDING	21,473	30.0%	0.9	0.27
LANDSCAPE / GRASS	50,453	70.0%	0.3	0.21
TOTAL	71,926	100.00%	"C" COMPOS. =0.48	

"C" AFTER: PROPOSED SITE

CONDITION	AREA (SF)	%	COEFF.	FRACT. COMP.
ASPHALT/BUILDING	7,252	10.0%	0.9	0.09
LANDSCAPE / GRASS	64,674	90.0%	0.3	0.27
TOTAL	71,926	100.00%	"C" COMPOS. =0.36	

APPROXIMATE TIME OF CONCENTRATIONS & STORM INTENSITIES

TC =5 MIN.(TIME OF CONCENTRATION - EXISTING)
 TC =5 MIN.(TIME OF CONCENTRATION - PROPOSED)
 I =3.3IN./HR.(2 YR STORM INTENSITY)
 I =4.5IN./HR.(10 YR STORM INTENSITY)
 I =5.3IN./HR.(25 YR STORM INTENSITY)
 I =6.7IN./HR.(100 YR STORM INTENSITY)

DETERMINE OFF-SITE RUNOFF - TOTAL SITE:

	2 YR	10 YR	25 YR	100 YR	
"Q" EXISTING = "C" COMP. X I X AREA =	2.62	3.55	4.19	5.29	CFS
"Q" PROP. = "C" COMP. X I X AREA =	1.95	2.66	3.13	3.95	CFS
NET INCREASE /DECREASE IN RUNOFF =	-0.67	-0.89	-1.06	-1.34	CFS

NOTE: NO INCREASE IN RUNOFF DUE TO INCREASE PERVIOUS SURFACES (14,221 SF).

Appendix 4

**LONG TERM STORMWATER SYSTEM OPERATION &
MAINTENANCE PLAN FOR
SOUTHEAST LANE, ACTON, MA**

The Stormwater Management Standards

Standard 9: A Long Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The Long Term Operation and Maintenance Plan shall at a minimum identify:

1. Stormwater management system(s) owners;
2. The party or parties responsible for operation and maintenance, including how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;
3. The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks;
4. Plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;
5. Description and delineation of public safety features; and
6. Estimated operations and maintenance budget.

The Operation and Maintenance Plan shall identify best management practices for implementing maintenance activities in a manner that minimizes impacts to surrounding areas.

The Proposal is for a private development.

Stormwater Management System

Property Owners:

PARKER LANE INVESTMENT TRUST
ANNA LUDWIG, TRUSTEE
205 WILLOW STREET
WALTHAM, MA 02453

404 MASSACHUSETTS AVE (MAP 3F, LOT 127)
NOTCA, LLC
205 WILLOW STREET
WALTHAM, MA 02453

394 MASSACHUSETTS AVE (MAP 3F, LOT 134)
394 MASSACHUSETTS AVE, LLC
205 WILLOW STREET
WALTHAM, MA 02453

General Contractor: TBD

The General Contractor shall have all logs and reports as stated within the Stormwater Pollution Prevention Plan readily available at all times for inspection by the Town of Burlington.

Method of recording for future Owners

- ☐ Deed
☐ Order of Conditions
☒ Other: Condition of Recorded Decision

SURFACE MAINTENANCE

COMPONENT: Parking Lot Sweeping

RESPONSIBILITY:

During Construction: General Contractor - TBD

Post Construction: Owner

ACTION: Street Sweeping with a High Efficiency Vacuum Sweeper

FREQUENCY:

During Construction: As needed

Post Construction: Quarterly, with sweeping scheduled in Spring & Fall

DESCRIPTION: Driveway and parking areas shall be swept quarterly per year (with sweeping scheduled in the Spring and Fall) to remove sediments prior to introduction into the stormwater management system. The Owner / Lessee will monitor all areas and remove sediments as necessary, considering both annual necessity and the need for more frequent cleaning during construction. Sweeping shall be performed with a high efficiency vacuum sweeper to remove sediments prior to introduction into the stormwater collection system. Washing and water jetting shall be discouraged.

BUDGET: \$250 /year based on quarterly sweepings post construction.

DRAINAGE SYSTEM

The following components shall be inspected:

- Inspection during or immediately following initial installation of sediment controls.
- Inspection following severe rainstorms to check for damage to controls.
- Inspection prior to seeding deadlines, particularly in the fall.
- Final inspection of projects nearing completion to ensure that temporary controls have been removed, stabilization is complete, drainage ways are in proper condition, and the final contours agree with the proposed contours on the approved plan.

Storm Events

2 year storm= 3.3 inches

10 year storm=4.5 inches

25 year storm=5.3 inches

100 year storm=6.7 inches

After the occurrence of any of the storm events noted above, or any other heavy rainfall that may have affected stormwater management facilities, the designated inspector shall inspect the components listed below for evidence of scouring or erosion, excessive sediment deposits, clogging of stormwater structures, or any other condition that may adversely affect stormwater management operations.

If any of these conditions are observed, then appropriate actions should be taken to restore the stormwater management facility so that it operates as intended.

COMPONENT: Stormwater Quality Unit (Stormceptor)

RESPONSIBILITY:

During Construction: General Contractor - TBD

Post Construction: Owner

ACTION: Inspection / cleaning

FREQUENCY: Per Manufacturer's Maintenance Guidelines or at least once per six months whichever is more restrictive depending on the rate of sediment accumulation.

DESCRIPTION: See attached Manufacturer's Maintenance Guidelines. All accumulated materials shall be disposed of in accordance with DEP regulations.

BUDGET: Inspection/cleaning- \$250/ yr based on inspections and cleanings of twice a year.

SAMPLE STORMWATER OPERATION & MAINTAINENCE ACTIVITY FORM

NOTE: The owner is responsible for maintaining an accurate and complete log of inspection & maintenance activities, including but not limited to, inspections, cleanings & repairs.

[illegible]